

**HEAT SUPPLY IN THE REPUBLIC OF BELARUS:  
CURRENT STATE AND PROSPECTS  
(Brief information)**

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## Features of the Belarusian energy sector

Energy sector features, 2019
Vertically-integrated structure
Strong government control and monopoly
Lack of domestic capacity and energy markets
Commissioning of the Astravets Nuclear Power Plant's first unit and its integration into the Belarusian Energy Sector (BES)
Self-sufficiency and redundancy of generating resources (NGS, CHP, CPP, station units: CHP, mini-CHP, HoB on local fuel types and natural gas, RES)
High degree of cogeneration and district heating
Lack of flexible capacity

Energy sector indicators, %	2010	2019
Energy self-sufficiency	14.7	16.5
Energy dependence	82	84.8
The share of natural gas in the structure of fossil fuels gross consumption	64.2	62
The share of the dominant energy resources (gas) in the production of heat and electricity	91.2	90.7
The production of primary energy based on RES to the volume of fossil fuels gross consumption	5.4	7.1
GDP heat intensity	100	80.4
Heat consumption per capita	100	89.5

# Legal framework for the organization and development of the heat supply system in Belarus

## Laws on:

- ❖ Energy saving
- ❖ Renewable energy sources
- ❖ The use of nuclear energy
- ❖ The project on Electricity

- **Concept of heating supply development in the Republic of Belarus until 2025**
- **Efficient Heat Supply sub-programme 3** in the Comfortable housing and Favorable environment State program for 2021-2025.
- **Heat supply rules** (September 11, 2019)

## Due to the commissioning of the Astravets Nuclear Power Plant:

- ❖ List of investment projects on the construction of peak-reserve energy sources and installation of electric boilers (January 18, 2019)
- ❖ Program for increasing energy consumption for heating, hot water supply and cooking for 2021-2025

## Concepts:

- ❖ national security of the Republic of Belarus (until 2035)
- ❖ energy security of the Republic of Belarus
- ❖ improvement and development of Housing and Public Utilities until 2025

Regulation on **pricing (tariffs) procedure** on natural and liquefied gas, electricity and **heat**

Instructions for determining the **electricity and heat consuming groups**, upon which **tariffs** for electricity and heat may be differentiated, etc.

## Programs:

- ❖ Energy saving for 2021-2025.
- etc.

## Technical codes for Common Practice:

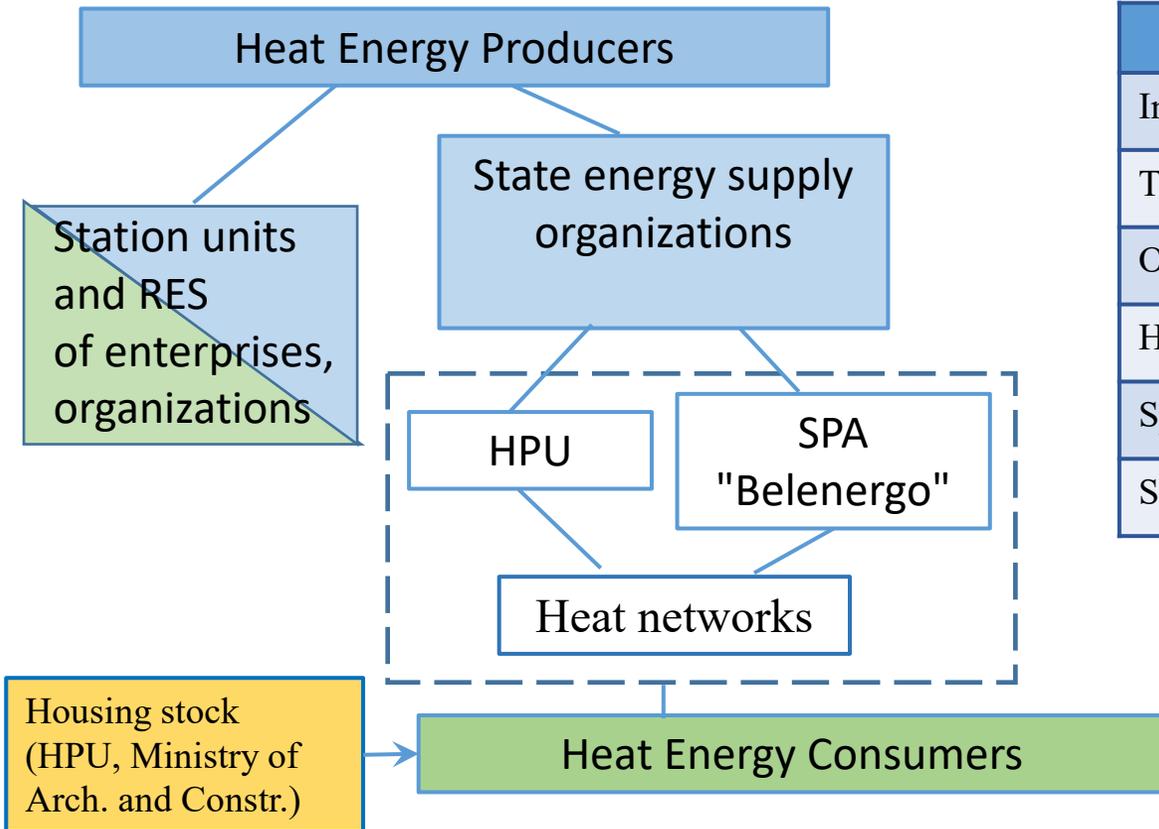
- ❖ 411-2012 on the Rules of Accounting for heat energy and heat carrier
- ❖ 458-2012 on the Rules of the maintenance of heat installations and consumers heat networks
- ❖ 459-2012 on the Safety rules for the maintenance of heat installations and consumers' heat networks

**4.02.05-2020 Building regulations** on Independent heat supply sources

### Projects of the Technical codes for Common Practice:

- ❖ 241-2010 on Feasibility study development procedure for the selection of heat supply schemes for the construction and reconstruction of facilities
- ❖ The procedure for calculating the value of the heat energy technological costs for its transmission in heat supply networks, taking into account their amortization, service life and operating conditions

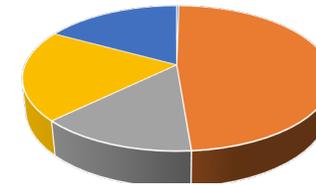
## Relevant data on the heat supply system in Belarus



Heat supply system (01.2021)	
Installed generating capacity, MW	10 073,99
The amount of heat produced, ths. Gcal (share of RES)	64 223 (10,6%)
Overall end-use, ths. Gcal	54 971
Heat energy output per capita, Mkal	2 347,28
Specific weight of losses in the total volume of heat consumption, %	8.4
Share of pre-insulated pipes, %	38

### State Production Association "Belenergo" (01.2021)

Installed generating capacity, MW (BES/RES)	8 897,31 /97,11
Heat energy output, mln. Gcal	32.00
Fuel rate, kg/Gcal	166.90
Heat networks lengths, thousand km.	7.56
Technological cost in heat networks, %	9.05



- public utility stations – 0,3% (164 Gcal)
- public CHP – 48,5% (28 724 Gcal)
- CHP and mini-CHP organizations – 14,0% (8 291 Gcal)
- district boilers – 20,2% (12 007 Gcal)
- organizations boiling installations – 17,0% (10 071 Gcal)
- geothermal and solar energy installations – 0,02% (12 Gcal)
- losses in transmission network – 7,25% (4 298 Gcal)
- end-use consumption by organizations – 55,4% (32 860 Gcal)
- served for population – 37,3% (22 111 Gcal)

### Housing and Public Utilities (2021)

Fuel rate, kgoe/Gcal	155-170
Heat networks lengths, thousand km. Replacement rate for pre-insulated pipes - 4% per year	15.8 (68.2% of pre-insulated pipes)
Losses in heat networks, %	9.8 ( by 2025-9%)

## Development drivers and trends

Climate and environmental conditions

- Climate zone
- Lack of primary energy resources - dependence on the import of gas

Vectors towards energy security and self-sufficiency, diversification

- High degree of centralization and energy cogenerating
- Self-sufficiency of the modernized energy sources
- Astravets Nuclear Power Plant - more than 30% of installed electric power
- Continuation of the renewal of the heat network fleet

Climate change, commitments under the Paris Agreement

### DRIVERS

### TRENDS

Energy saving

Optimization of development and regimes based on the conditions of socio-economic and territorial development, integration of Astravets Nuclear Power Plant in energy sector

Reasonable decentralization and implementation of RES

Innovative technologies, automation and digitalization

# Directions and measures for improvement and development of heat supply system in Belarus 2000-2020

## Directions:

- Energy saving and energy efficiency
- Maximum use of local fuel types

## Measures:

- ❖ Improvement and development of legal and regulatory framework (Laws and Statutory Instruments, technological regulations)
- ❖ Development and modernization of heat supply system
- ❖ Development and modernization of energy resources (CHP, mini-CHP (gas turbine plants, gas-pumping unit) on gas and local fuel types)
- ❖ Modernization of boiler system with the elimination of inefficient boilers and converting to local fuel types and automatic mode of operation
- ❖ Replacement of heat networks (SPO "Belenergo"; HPU - more than 7000 km. of heat networks (about 720 km, i.e. > 4% per year) using pre-insulated pipes
- ❖ Heating system modernization of the housing stock and construction of energy-efficient houses
- ❖ Accounting and automation of heat supply processes in production, transportation and consumption systems
- ❖ Equipment of the housing stock and other heat consumers with metering and control devices
- ❖ Economic measures: creating a favorable investment climate, tariff policy, preferences

## Elements of experimental energy-efficient houses of the 2nd generation

From the category of pilot projects to standard ones

1. Increased resistance to heat transfer of enclosing structures
2. Supply and exhaust house-to house ventilation with heat recovery of the discharged air
3. Heat pumps with the use of heat from municipal sewage lines and ground (Grodno)
4. Use of thermal energy of "gray" drains from washbasins, baths, washing machines for water heating of the hot water system (Grodno)
5. To compensate electricity costs for heat pumps - on the south face and roof-solar panels of 250 m<sup>2</sup> are used (74kW of power, 13KW\*h of average annual output) (Grodno-120 apartments)
6. Solar collecting panels on the roof of a 10-story building for hot water system (Mogilev - 180 apartments)
7. Heating system with horizontal wiring with individual (house-to-house) accounting and regulation of heat consumption (the fee for heat and hot water is about 40% less)
8. Automated system for monitoring engineering equipment and remote reading of resource consumption indicators
9. Individual heating unit of the district heating system as a backup heating source and hot water supply, conjugated with systems and equipement

**2.04.02-2020 Building regulations on Buildings and structures. Energy efficiency**

# Directions and measures for improvement and development of heat supply system in Belarus

2021-2030

## Directions:

- Integration of the Astravets Nuclear Power Plant into energy mix and country energy system
- Improved flexibility and reliability
- Energy saving and energy efficiency
- Economically feasible use of RES and local fuel types
- Creating conditions for de-monopolization and market relations

## Measures:

- ❖ Improvement and development of legal and regulatory framework (Laws and Statutory Instruments, technological regulations), organizational structure
- ❖ Optimization of generating capacities: CCGT, GTU based on CHP plants, decommissioning of some of the condensation sources and replacement of inefficient heating systems
- ❖ Optimization of the equipment of CHP plants and boiler houses of the energy system, HPU and enterprises with the installation of electric boilers and the withdrawal of obsolete capacities
- ❖ Automation, digitalization in the systems of production, transportation and consumption of heat with the prospect of creating a unified management and accounting system
- ❖ Transition to decentralized heat supply systems for remote consumers (electric heating, local fuel and energy sources, heat pumps)
- ❖ Elimination of long heating lines, reducing damage of heat networks by increasing the use of pre-insulated pipelines. Connecting to networks using an independent scheme via the Individual Heating Plants
- ❖ Heating system modernization of the housing stock and construction of energy-efficient houses with the use of RES (heat pumps, photovoltaics, etc.); group and individual heating units
- ❖ Construction and reconstruction of houses using electricity for heating, hot water supply, cooking with heat accumulators
- ❖ Use of secondary energy sources
- ❖ Economic measures: creating a favorable investment climate, tariff policy, preferences

Thank you for your attention

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